Version 1.0
January 2003

LA17a

OWNERS MANUAL

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. APPROVALS

This equipment conforms to the requirements of the EMC directive 89/336/EEC, amended by 92/31/EEC and 93/68/EEC, and the requirements of the Low Voltage Directive 73/23/EEC, amended by 93/68/EEC.

Standard Applied	EMC Emission	EN55103-1, E3
	EMC Immunity	EN55103-2, E3, with S/N below 1% at normal operation level.
	Electrical Safety	EN60065, Class I

2. WARNINGS

2.1 EXPLANATION OF GRAPHICAL SYMBOLS

The lightning symbol within a triangle is intended to alert the user to the presence of un-insulated "dangerous voltage" within the amplifier's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to humans.

The exclamation point within a triangle is intended to alert the user to important operating and service instructions in the literature accompanying the product.

2.2 WARNING

To reduce risk of fire or electric shock, do not expose this apparatus to rain or moisture.

2.3 CAUTION

To reduce the risk of fire or electric shock, do not remove screws. No user-serviceable parts inside. Refer servicing to qualified service personnel.

2.4 IMPORTANT SAFETY INSTRUCTIONS

Before using your amplifier, be sure to carefully read these operating instructions and follow the safety suggestions outlined below:

1. Keep this manual for future reference.
2. Heed all warnings.
3. Follow all instructions.
4. Do not use this unit near water. Do not spill water or other liquids into or on the unit. Do not operate the amplifier while wet or standing in liquid.
5. Clean only with a dry cloth.
6. Do not block the air intake or exhaust ports. Install the unit in accordance with the instructions outlined in this manual.
7. Do not operate the amplifier near heat producing devices such as radiators, heat registers, stoves or any other apparatus that produces heat.
8. Always operate the unit with the chassis ground wire connected to the electrical safety earth. Do not defeat the safety purpose of the grounding-type plug. A grounding-type plug has two pins and a third grounding prong. The third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
9. Connect only to AC power outlets rated 230-240 V, 50-60 Hz.

10. Do not use this amplifier if the power cord is broken or frayed. Protect the power cord from being walked upon or pinched - particularly at the plugs and the point where the power cord exits from the apparatus.
11. Only use accessories specified by the manufacturer.
12. The unit is intended to be mounted in a 19" rack. Follow the mounting instructions outlined in this manual and always rear support the unit when used in portable applications. When a rack on wheels is used for portable applications, use caution when moving the loaded rack in order to avoid injury from tipping over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Do not connect an amplifier output in parallel or series with any other amplifier's output. Do not connect the amplifier output to any other voltage source, such as a battery, mains source, or power supply, regardless of whether the amplifier is turned on or off.
15. Do not run the output of any amplifier back into another channel's input.
16. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as:
    - Power supply cord or plug is damaged
    - Liquid has been spilled into the unit
    - An object has fallen into the unit
    - The unit has been exposed to rain or moisture
    - The unit does not operate normally
    - The unit was dropped or the enclosure is damaged
17. Do not remove top or bottom covers. Removal of the cover will expose hazardous voltages. There are no serviceable parts inside and removal may void the warranty.
18. An experienced user shall always supervise the use of professional audio equipment, especially if inexperienced adults or minors are using the equipment.

2.5 USER RESPONSIBILITY

2.5.1 SPEAKER DAMAGE

Your amplifier is very powerful and can be potentially dangerous to both loudspeakers and humans alike. Loudspeakers can be damaged or destroyed by overpowering, especially with the high power available from a bridged amplifier. Always check the loudspeaker's continuous and peak power handling capabilities. Note: even when using the amplifier's front panel attenuator to reduce the gain, it is still possible to reach full output power if the input signal level is high enough.

2.5.2 SPEAKER OUTPUT HAZARD

Power amplifiers are capable of producing hazardous output voltages. To avoid electrical shock, do not touch any exposed speaker wiring while the amplifier is operating. Refer to Section 6.2 concerning proper connection of loudspeakers.

2.5.3 RADIO INTERFERENCE

A sample of this product has been tested and complies with the limits for the European Electro Magnetic Compatibility (EMC) directive. These limits are designed to provide reasonable protection against harmful interference from electrical equipment. This product uses radio frequency energy and if not used or installed in accordance with these operating instructions, may cause interference to other equipment such as radio receivers. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does appear to cause harmful interference to radio or television reception, verify by turning the equipment on and off. The user is then encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Check if the affected unit complies with the EMC limits for immunity (CE-labelled). If not, address the problem with the manufacturer or supplier of the affected unit. All electrical products sold in the EC must be approved for immunity against electromagnetic fields, high voltage flashes, and radio interference.
- Consult the dealer or an experienced radio/TV technician for further assistance.

3. INTRODUCTION

Thank you for purchasing the L-ACOUSTICS LA17a power amplifier. This manual contains important information on operating your power amplifier correctly and safely. Please take time to read this manual in order to familiarize yourself with the many advanced features of this amplifier.

3.1 UNPACKING

Carefully open the shipping carton and check for any noticeable damage. Every L-ACOUSTICS amplifier is tested and inspected before leaving the factory and should arrive in perfect condition. If found to be damaged, notify the shipping company immediately. Only the consignee may institute a claim with the carrier for damage incurred during shipping. Be sure to save the carton and packing materials for the carrier's inspection.

It is also advisable to save the carton and packing material even if the amplifier is undamaged. Should you ever need to ship the amplifier, always use the original packing.

3.2 FRONT PANEL

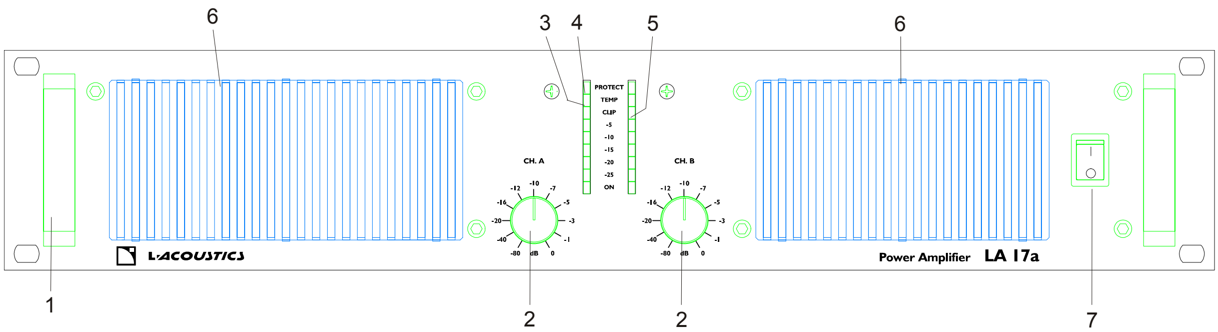


Figure 1: LA17a Front Panel

1. Carry/Protection Handle

Both handles can be used to carry the amplifier and the handles also provide protection for the front panel. For fixed installation (or when rack front covers are too shallow) the handles may be removed by unscrewing the retaining bolts behind the front panel.

2. Input Level Attenuators

These controls are used to alter the signal level entering the amplifier. They are calibrated in dB to assist in the setup of active loudspeaker systems. Input attenuation can also be used to reduce unwanted noise from the input signal. See Section 7.4 for further details.

3. Over Temperature Protect Indicator

This indicator illuminates if the amplifier tries to operate above its maximum operating temperature (90°C). The indicator first comes on as a warning to either turn down the input level or check amplifier ventilation. Beyond the maximum temperature the amplifier will mute the input signal. When cooling fans have returned the output heat sinks back to normal operating temperature, the input signal is un-muted.

4. Protect Indicator (VHF and short circuit)

This indicator illuminates when signals above 12 kHz are continuously present at full power at the output terminals. If this occurs the input signal is muted and the process cycles until the VHF signal is no longer present.

5. Clip/Limit Indicator

This indicator signals when the amplifier output is clipping or limiting. There are two different indication states depending on whether the rear panel clip limiter is engaged (see Sections 4.2, 8.1):

- If the clip limiter is engaged, the Clip/Limit Indicator has a short time constant and illuminates briefly.
- If the clip limiter is not engaged, the Clip/Limit Indicator has an increased time constant and illuminates for a longer period.

6. Fan Grill Filters

Two grilles with foam filters are located on the front panel in order to prevent dust from entering the amplifier. The grilles are removed by simply pulling them off, allowing for convenient cleaning of the filters. Foam filters should be used at all times.

7. Power Switch

Turns the mains power on or off.

3.3 REAR PANEL

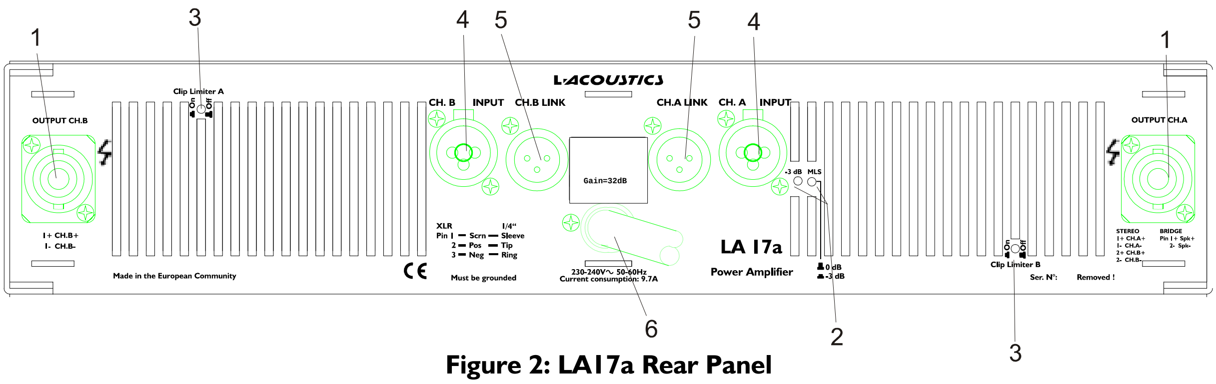


Figure 2: LA17a Rear Panel

1. Output Speaker Connector

The Neutrik® Speakon connector may be unfamiliar to some users. A full description is found in Section 6.2.

2. Minimum Load Selector (MLS™) Switch

These switches are used to select the maximum output power. See Section 4.1.

3. Clip Limiter Switch

Turns the clip limiter on (switch IN position) or off (switch OUT position). See Sections 4.2, 8.1

4. Input Signal Connector

The Neutrik® Combojack features XLR and ¼" TRS phone jacks. (Pin 2 is "hot", see Section 6.1.1).

5. Link Output

XLR male connector (5) connected in parallel to the female connector (4) for linking the channel to another input.

6. AC Power Cable

4. REAR PANEL FEATURES

4.1 IMPEDANCE MATCHING (MLS SWITCH)

The MLS™ (Minimum Load Select) switches located on the rear panel offer power/impedance matching, allowing the LA17a to power 2 ohm loads without increased heat loss. Please refer to Table 1 to determine the power delivered into a specific load for various MLS switch settings. Note that higher powers can be achieved utilising higher MLS positions when connected to lower speaker impedances and as can be seen in Table 1, the LA17a can produce output power in excess of 850 watts. Essentially, the LA17a amplifier is a power converter and by selecting MLS positions you are allocating a portion of the available 1700 watts power.

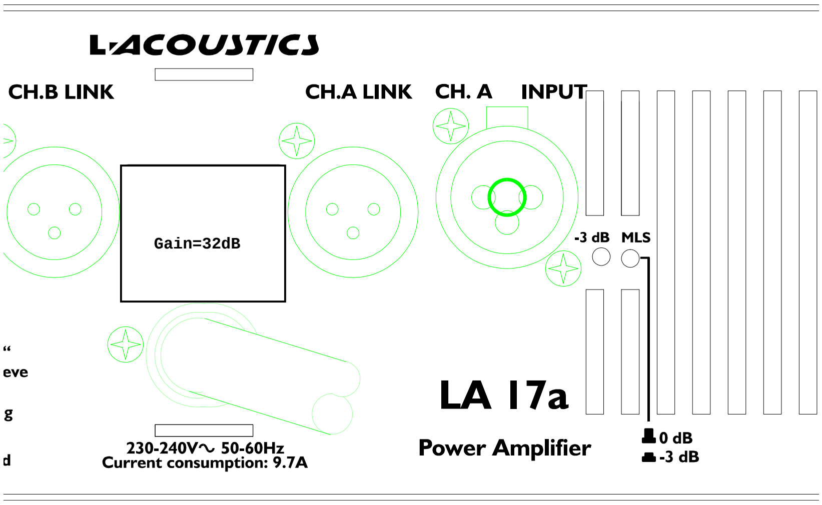


Figure 3: LA17a Rear Panel MLS Switches

Table 1: Output Power Ratings and MLS Switch Settings for the LA17a

LA17a

LOAD	CONFIGURATION	-3 dB	0 dB
16 ohms	Stereo (2 channel)	110 W	215 W
8 ohms	Stereo (2 channel)	220 W	430 W
4 ohms	Stereo (2 channel)	430 W	840 W
2 ohms	Stereo (2 channel)	870 W	1200 W
16 ohms	Bridged mono	440 W	840 W
8 ohms	Bridged mono	870 W	1680 W
4 ohms	Bridged mono	1740 W	2400 W

Power in watts (EIA 1 kHz, 1% THD)

MLS positions can be different for each channel and a variety of combinations can be selected as seen in Table 2. There is no risk for amplifier damage since the LA17a is very well protected (even down to 0.3 ohms). However, if uncertain or where time does not allow, use the default position (MLS = 0 dB).

Table 2: MLS Switch Setting Applications

Channel	Impedance	MLS	Power	Comments
A **B**	**8** **8**	**-3dB** **-3dB**	**220W** **220W**	**Power reduction**
A **B**	**4** **4**	**0dB** **0dB**	**840W** **840W**	**High peak power**
A **B**	**8** **8**	**0dB** **-3dB**	**430W** **220W**	**Power matching**
A **B**	**8** **4**	**-3dB** **0dB**	**220W** **840W**	**Power sharing**

4.2 CLIP LIMITER

The LA17a Channel A, B clip limiters prevent dangerous clipped signals from reaching the loudspeaker and causing damage. When an amplifier is severely overdriven, the output waveform is clipped and peaks become squared off, causing a reduction in crest factor. In extreme cases, the waveform can approach that of a square wave. Normally an amplifier is capable of producing far more power under these conditions than its normal, undistorted rated output power.

The LA17a clip limiter works by monitoring the output and comparing the distortion produced between the input and output of the amplifier. If the distortion exceeds 1% THD for any reason (voltage or current clipping), the limiter reduces the input signal proportionally. Once the amplifier comes out of a protect condition, the output level has a slow rise time (the effect is like turning the gain up slowly). Under normal operation, clip limiting circuitry is inaudible.

Note: if the signal is distorted or clipped before it reaches the amplifier, the clip limiter cannot detect this and will not be activated.

Channel A, B clip limiters can be turned on (or off) by depressing (or pressing) the relevant clip limit switch. L-ACOUSTICS recommends leaving the clip limiters switched ON (button depressed) at all times.

Clip Limiter ON = switch depressed (IN position)
Clip Limiter OFF = switch not depressed (OUT position)

5. INSTALLATION

5.1 MOUNTING

The LA17a is two rack units high (2U) and will mount in an EIA-standard 19" rack. Four mount points are provided on the front panel of the amplifier for rack mounting.

For permanent installation, the amplifier can be mounted using standard 19" rack mount rails and/or slides within the amplifier rack using the four front mount points. Amplifiers may be stacked directly on top of each other and there is no need for spacing between units. If it is the intention to fill a rack with amplifiers, we recommend racking is started from the bottom of the rack. It is also recommended that rear supports are used for amplifiers mounted in the middle of the rack.

For touring or portable sound system applications, it is essential that all LA17a amplifiers are rear supported in addition to front panel mounting.

Any mechanical damage to LA17A amplifiers used in portable applications without rear support are not covered under warranty.

For all portable applications, the amplifier should be fixed in the back with a rear support kit (L-ACOUSTICS part code: APSUP). The amplifier support kit APSUP is a universal rear support kit for any 19" rack since it is adjustable to accommodate varying rack depths. Two rear support brackets, two amplifier support brackets, four M4 hex button head screws and four washers are included in each APSUP kit. The kit integrates the amplifier support bracket with the amplifier and the rack support bracket with the rack. Depth is adjustable and amplifiers can be removed from the rack by simply removing the 4 button head screws. APSUP is suitable for use with all LA amplifiers.

5.2 COOLING

Your amplifier uses a forced air cooling system to maintain a low and even operating temperature. All fan cooled L-ACOUSTICS amplifiers have front to rear airflow. There are several reasons for this, one being that there is usually cooler air outside the rack than inside and therefore the amplifiers can run at higher continuous power levels without thermal problems. Never try to reverse the airflow since the Intercooler® needs a pressure chamber between the fans and heat sink and this only works in one direction of the airflow.

Should a heat sink get too hot, its sensing circuit will mute the overheated channel. If the power supply overheats, another sensing circuit will mute all output channels until the power supply cools down to a safe operating temperature.

Make sure that there is an adequate air supply in front of the amplifier, and that the rear of the amplifier has sufficient space to allow the exhaust to escape. If the amplifier is rack-mounted, do not use covers or doors on the front or rear of the rack.
For installations with a central cooling system (usually found in fixed installations with a dedicated rack room) it may be necessary to calculate the maximum heat emission. Please refer to Sections 5.6 and 5.7 concerning Power Consumption and Heat Power Calculation.

5.3 OPERATING VOLTAGE

WARNING!
A label just below the mains cable on the rear of the amplifier indicates the AC mains voltage for which the amplifier is wired. Connect the power cable only to the AC source referred to on the label. The warranty will not cover damage caused by connecting to the wrong type of AC mains.

L-ACOUSTICS switch mode amplifiers use primary switching, i.e. the mains power is rectified directly before the transformer, which means that the power supply is insensitive to the mains frequency and will operate from DC to 400 Hz.

The amplifier is supplied with an approved European AC line connector. If this power plug is not appropriate for your country, it can be cut off and wired to a suitable connector in the following manner:

BLACK or BROWN	**LIVE**
WHITE or BLUE	**NEUTRAL**
GREEN or GREEN/YELLOW	**EARTH**

Once the AC connector is connected to a suitable AC supply, the amplifier can be started with the power switch. When you power up the amplifier it takes a couple of seconds to check its circuits (this is known as the soft or slow start sequence), the fans then blow at high speed before going into idle and the two bottom green LED's come on to indicate that the output circuits are receiving the correct rail voltage.

5.3.1 DENMARK

National deviation concerning installation of the LA17a:
Danish safety regulations stipulate the use of an 8 A mains fuse. Since the LA17a uses an internal primary mains fuse of 15A, the LA17a must be equipped with an industrial mains connector rated for 16 A or, alternatively, be installed to a fixed 16A circuit.

5.3.2 SWITZERLAND

National deviation concerning installation of the LA17a:
Swiss safety regulations stipulate that a type 23 mains connector must be used.

5.4 GROUNDING

There is no ground lift switch or terminal on this amplifier. The signal ground is always floating via a resistor to chassis and the grounding system is automatic. If a potential above 0.6 V presents itself between signal ground and chassis ground, a short circuit is introduced between the two, thereby enabling electrical protection. If a unit in the system is faulty, its mains fuse will blow due to this automatic ground system.

If you wish to tie the signal ground to chassis, connect the XLR-connector's shell lug to pin 1. In the interest of safety <u>never disconnect the earth pin on the AC power cord</u>.

For all units that are CE-approved (radio interference), there is an AC mains filter. This filter needs the chassis ground for reference, otherwise a current loop is formed via the signal ground.

Use the balanced inputs to avoid hum and interference.

5.5 POWER CONSUMPTION

There are three ways to define the power/current consumption of a power amplifier:

First, the peak current draw at full output power. Under this condition the power amplifier will trip the mains breaker within 30 seconds and the amplifier will operate for less than 2 minutes before thermally limiting. It is therefore meaningless to state the input power at full power since the heat power at full power will be limited by the protection circuits. In practice, there are no audio program materials which produce sustained full output power (only sine wave signals for test purposes).

It is more useful to state the **current draw** for different loads and output power levels. The current draw is stated in Amperes (rms) and this figure corresponds to the value of the mains fuse required.

Table 3: LA17a Current Draw @ 4 ohms

Operating Condition	Current Draw in Amperes (rms)
Idle state (no load)	1 A (rms)
1/8 of full power (- 9 dB)	6 A (rms)
1/3 of full power (-5 dB)	9 A (rms)
Full power (0 dB) at 1 kHz, 1% THD	16 A (rms)

Second, the maximum expected average current under worst case conditions, corresponding to 1/3 full power program material according to the FTC standard. At this level the music will be in a state of constant clip and is therefore the highest power level one can obtain without completely obliterating the program material.

Third, the normal operating power, as defined by the safety standard IEC 65/ANSI/UL 6500 and used by a majority of safety agencies. The normal operating power is measured using pink noise, with an average output power equal to 1/8 of full power. The 1/8 full power specification is as loud as you can play music while making some attempt to avoid obvious clipping and corresponds to 9 dB of headroom (which is very low for normal audio program).

Table 4: LA17a Maximum Output Power versus Mains Input Power

MAXIMUM OUTPUT POWER			MAINS INPUT POWER		
Load	**# of ch**	**Power**	**1/3 Power**	**1/8 Power**	**Idle**
		(watts)	(see note 1)	(see note 2)	
8 ohms	2X	430	730	480	115
4 ohms	2X	840	1330	840	115
2 ohms	2X	1200	2200	1400	115
note 1	Mean power with music as program source (amplifier driven to clip level)				
note 2	Normal music power with 9 dB headroom (IEC standard power rating)				

It is recommended that you specify your power distribution service to ensure sufficient current for at least 1/8 power operation and to upgrade service to meet 1/3 power requirements for heavy duty demands like discos etc.

5.6 HEAT POWER CALCULATION

The heat power can be calculated according to the following example:

Consider headroom of at least 9 dB (1/8 of full power) and a 4 ohm load on an amplifier producing 840 watts per channel. The 1/8 power per channel is then: 840 / 8 = 105 watts; and the total output power is : 2 x 105 = 210 watts.

The power consumption according to Table 4 is 840 watts (Table 4 gives the active power consumption of the amplifier for different loads and power levels).

The **heat power** produced is the difference between the power consumption and the output power: 840 - 210 = 630 watts per amplifier.

5.7 GAIN AND SENSITIVITY

As standard, the LA17a is delivered with 32 dB gain. For most professional applications, mixing consoles operate at a nominal level of +4 to +6 dBu, therefore the 32 dB position provides optimal gain structure with plenty of fader movement. In addition, all L-ACOUSTICS LLC analog controllers and OEM factory presets for approved digital processors are optimized for use with 32 dB gain amplifiers.

Sensitivity is defined as how many volts (rms) or dBu (referred to 0.775Vrms) are required at the amplifier input to obtain full output power. Since the output power delivered varies with the load impedance, 4 ohms is generally taken as the reference. For the LA17a, full output power into 4 ohms is 840 W (MLS switch = 0 dB) and standard gain is 32 dB. This corresponds to an input sensitivity of 1.46 Vrms or 5.5 dBu.

For the LA17a, the input sensitivity will depend on the specific MLS switch setting. Input sensitivity is summarized below in Table 5.

Table 5: LA17a Output Power and Input Sensitivity versus MLS Switch Setting (32 dB gain)

LA17a

LOAD	CONFIGURATION	-3 dB	0 dB
16 ohms	Stereo (2 channel)	110 W (2.7 dBu)	215 W (5.6 dBu)
8 ohms	Stereo (2 channel)	220 W (2.7 dBu)	430 W (5.6 dBu)
4 ohms	Stereo (2 channel)	430 W (2.6 dBu)	840 W (5.5 dBu)
2 ohms	Stereo (2 channel)	870 W (2.6 dBu)	1200 W (4.0 dBu)
16 ohms	Bridged mono	440 W (2.7 dBu)	840 W (5.5 dBu)
8 ohms	Bridged mono	870 W (2.6 dBu)	1680 W (5.5 dBu)
4 ohms	Bridged mono	1740 W (2.6 dBu)	2400 W (4.0 dBu)

Power in watts (EIA 1 kHz, 1% THD)
Sensitivity in dBu

6. CONNECTIONS

6.1 INPUT CONNECTIONS

6.1.1 BALANCED INPUTS

XLR Input connectors are active balanced and wired according to IEC 268 (i.e., pin 2 hot) in the following way:

PIN 1	GROUND/SHIELD
PIN 2	HOT (+)
PIN 3	COLD (-)

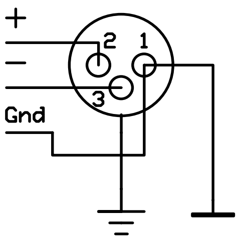


Figure 4: XLR Input Connector Wiring

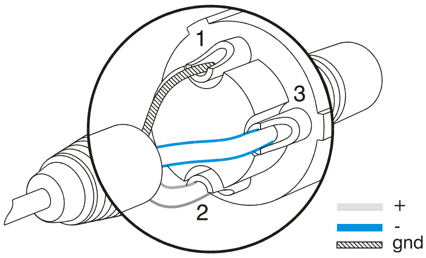


Figure 5: Balanced XLR wiring

The Neutrik® Combojack includes a ¼” (6.3 mm) phone jack, which is wired in parallel with the XLR in the following manner:

TIP	HOT
RING	COLD
SLEEVE	SHIELD/GROUND

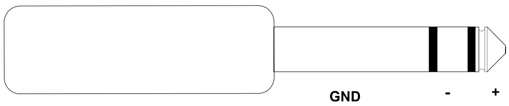


Figure 6: ¼” TRS plug

The input impedance is high enough (20 kOhms, balanced) to allow ”daisy-chaining”, or multiple parallel input connections. The headroom of the input circuits is also high enough to accept the maximum output level from virtually any low-level signal source. Balanced signals are less sensitive to AC hum and radio interference. The source impedance should be less than 1 kOhms in order to avoid high frequency loss in long cables.

To daisy chain amplifiers, use the XLR-male connector, labeled **Link**, provided on each channel. This connector is wired in parallel with the Neutrik® Combo jack on each input.

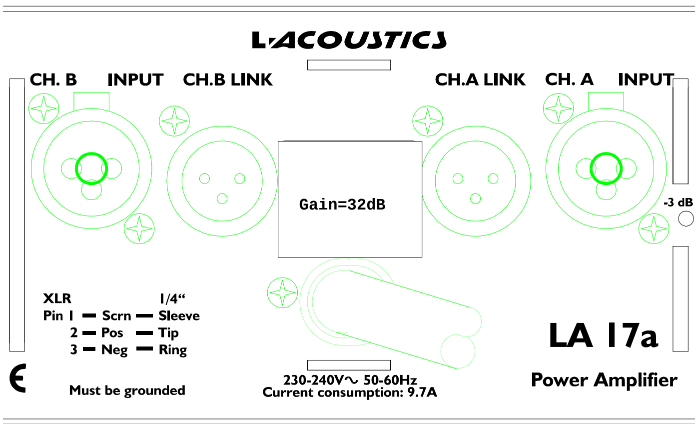


Figure 7: LA17a Rear Panel Detail

6.1.2 UNBALANCED INPUTS

To connect an unbalanced source, tie pin 3 (ring on TRS jack) to the shield of the connector. Note: if you leave pin 3 disconnected, you will lose 6 dB.

A better method for using unbalanced sources is shown in Figure 8. This is similar to the connection for balanced lines, but pin 3 is connected to the shield at the source. The hum and noise rejection for the cable is equivalent to that for a balanced line. To minimize hum, use balanced inputs whenever possible.

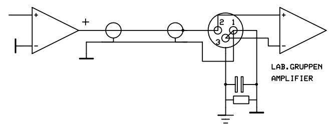


Figure 8: Unbalanced Line Connection

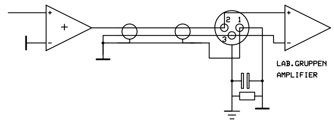


Figure 9: Balanced Line with Unbalanced Equipment

6.2 CONNECTING SPEAKERS

Speaker connections are made via the two **Neutrik® NL4FC Speakon** connectors. The Speakon connector is designed for high power speaker connections and assures correct polarity, locks securely in place and prevents from shock hazard.

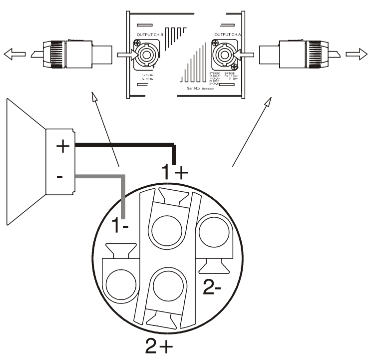
The LA17a power amplifier Speakon connectors are wired in the following manner:

	Channel A	Channel B
Pin +1	**Channel A+**	**Channel B+**
Pin -1	**Channel A-**	**Channel B-**
Pin +2	**Channel B+**	
Pin -2	**Channel B-**	

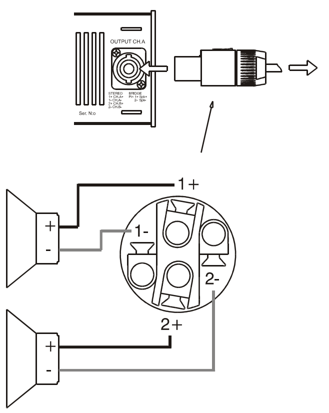
For normal two-channel operation, connect each speaker load across the Channel A, B output terminals (positive and ground).

Since the Channel A Speakon is bi-wired, it is possible to access both channels on a single connector. For bi-amped operation, be careful whether Channel A or B outputs are assigned to the LF or HF component of your active loudspeaker system. As standard, L-ACOUSTICS active 2-way loudspeakers are cabled as follows: LF +/- = 1+/1- (Ch A) ; HF +/- = 2+/2- (Ch B). Also pay attention to speaker polarity: loudspeakers connected out of phase degrade sound quality and may be damaged as a consequence.

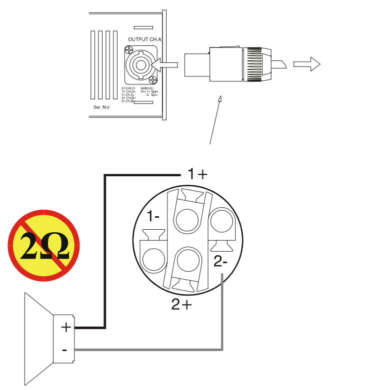
Figure 10: Loudspeaker Connection Details



Channel A and B connected via two separate Speakons



Channel A and B connected via one Speakon (for bi-amp applications)



Bridged mono connection via Channel A output connector (pins 1+/2-) to loudspeaker (+/-)

In order to preserve high damping factor (essential to the sonic qualities of your loudspeaker system and to prevent overshoot of cone displacement which can result in mechanical damage), it is desirable to keep loudspeaker cables as short as possible and with a gauge offering low resistance per unit length. Do not use shielded wire, such as microphone or guitar cable and remember that the speaker cable robs the power of the amplifier by increasing the load impedance and introducing resistive power losses (so called I^2R losses). The following table provides information regarding the minimum wire cross-section versus length:

Table 6: Maximum Recommended Length for Damping Factor > 20

Cross Section	Gauge	8 ohms		4 ohms	
Metric (mm2)	Imperial	Metric	Imperial	Metric	Imperial
2.5	13	30 m	100 ft	15 m	45 ft
4	11	50 m	150 ft	25 m	75 ft
6	8	75 m	225 ft	37 m	110 ft
10	6	120 m	360 ft	60 m	180 ft

7. OPERATION

7.1 OPERATION MODES

7.1.1 STEREO MODE

In this mode, both channels operate independently of each other and the level attenuators on the front panel control the respective channel levels.

Never connect either Channel A or B output Speakon terminals to ground or in parallel. The recommended minimum nominal impedance for stereo operation is 2 ohms per channel.

Note Concerning Bench Test Procedures:
Channel B is always polarity reversed at the input, but this polarity reversal is internally compensated for by feeding the minus pin on the Channel B output with the positive output voltage. Channel A is operated with normal polarity. With channel A and B operating in opposite or reverse polarity, the energy storage in the power supply is more efficient. This is significant for signals below 100 Hz (sub bass etc) and improves the power bandwidth. Note: Formerly, this was referred to as reverse stereo operation for the LA17.

For this reason, be sure to use balanced inputs on all measurement equipment (also oscilloscope probes) if you are bench testing.

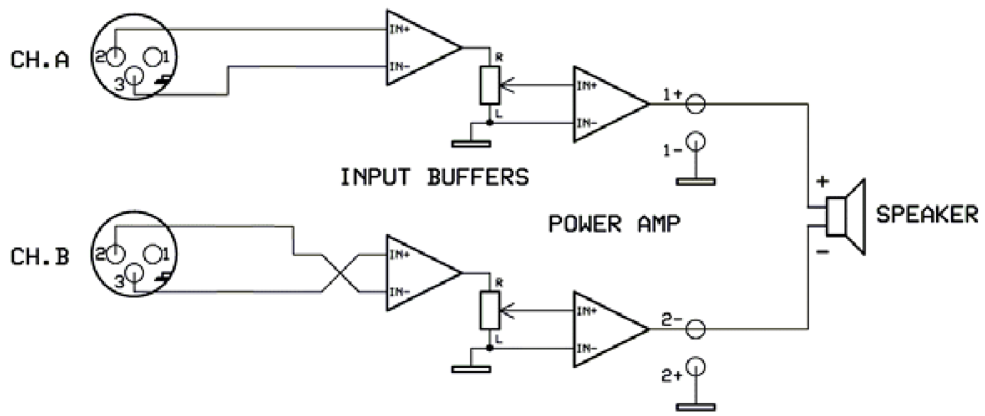


Figure 11: Reverse polarity operation for Channel B

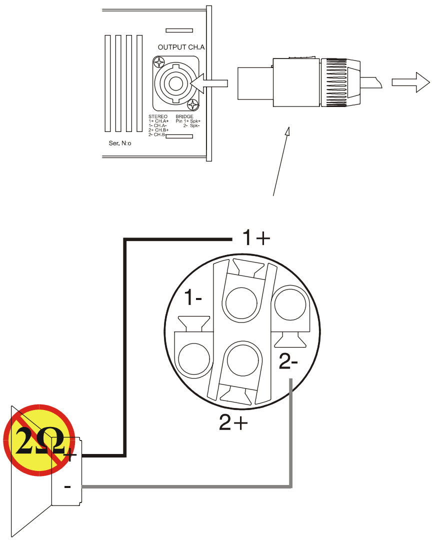
7.1.2 TANDEM MODE

In tandem mode both Channel A and B inputs are linked and receive the same signal. Channel B to A linking is performed by physically connecting from the Ch A LINK connector (male XLR) to the Ch B INPUT connector (Neutrik® Combo jack). Both Channel A and B level attenuators are active, allowing you to set different levels for each channel.

Note: only the inputs are connected in parallel and this is NOT a parallel output mode. **Never connect either output terminal to ground or in parallel.**

7.1.3 BRIDGED MONO MODE

Figure 12: Bridged mono cabling



Bridged mono mode is used to deliver both channels' power to a single load. The nominal impedance of the load must be more than 4 ohms.

The input signal is applied to Channel A and then linked to the Channel B input by physically connecting from the Ch A LINK connector (male XLR) to the Ch B INPUT connector (Neutrik® Combo jack). Both Channel A and B level attenuators must be at the same position and it is recommended that they are operated in the 0 dB (full) position.

Connect the loudspeaker as shown and always use the Channel A output connector.

7.1.4 BRIDGED MONO MODE FEATURES

Bridged mono mode combines the power of both channels into one speaker. This results in twice the voltage swing, four times the peak power and just less than three times the full power of a single channel.

One way to understand the load and power from the amplifier's perspective in bridged mode is that it is zero voltage at the center of the voice-coil winding. This is because the coil is driven with positive voltage at one pole and an equivalent negative voltage at the other pole. So, if an 8 ohm load is connected in bridged mode, one channel shares one 4 ohm part of the load and the other channel shares the other 4 ohm part. The power into 4 ohms from an LA17a (MLS at 0 dB) is 840 W. Therefore, the total bridged power into the 8 ohm load will be 2 x 840 = 1680 W.

7.2 OPERATING PRECAUTIONS

Never connect either Channel A or B output terminals to ground or to some other output or input terminal (see also warnings in Section 2.4).

For normal two-channel operation, connect each speaker load across the output channel's positive and negative terminals. **Pay attention to speaker polarity - loudspeakers connected out of polarity degrade sound quality and may be damaged as a consequence.**

WARNING: To prevent electrical shock, do not operate the amplifier with any of the conductor portion of the loudspeaker cable exposed.

- Refer to Sections 5.1 and 5.2 concerning amplifier mounting and cooling considerations.
- Make sure that the AC mains voltage is correct and the same as the one printed on the rear panel of the amplifier. See Sections 5.3-5.7 concerning operating voltage, grounding and power consumption for more details.
- Make sure that the power switch is set to "off" before making any input or output connections or operating the switches on rear panel.
- Make sure that the switches on the rear panel for clip-limiters and the MLS™ switches are in the correct position. See Section 7 concerning operation modes, Section 8.1 about clip limiters and Section 4.1 concerning the MLS switches.
- It is always a good idea to turn down the gain controls during power-up to prevent speaker damage in case a high signal is present at the input.
- Remember the old saying: "amps on last, amps off first"

7.3 POWERING UP – SOFT START

When you power up the amplifier it takes a few seconds to check its circuits (this is known as the soft or slow start sequence). The fans blow at high speed before going into idle and the two bottom green LEDs illuminate to show the amplifier is operational.

7.4 INPUT ATTENUATORS

The two input level attenuators on the front panel adjust the signal level for their respective amplifier channel in all modes. Input level attenuators are calibrated in dB to assist in setting up active loudspeaker systems or cutting down unwanted noise from the input signal.

In bridged mode, both controls must be in the same position so that the speaker load will be shared equally between the channels.

7.5 INDICATORS

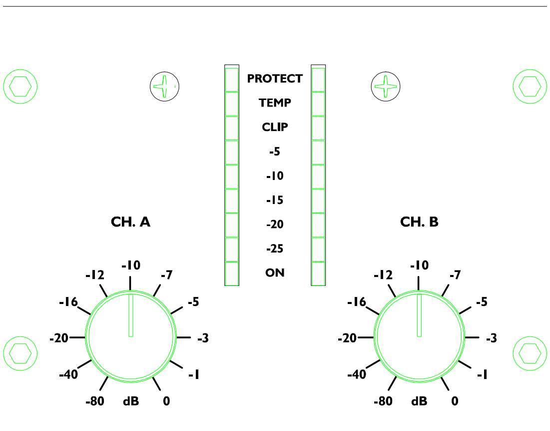


Figure 13: LA17a Front Panel Detail

The two bottom green "ON" LED's indicate that the output circuits are receiving the correct rail voltage.

The "-25 dB" LED's illuminate if the output signal is greater than -25dB (with 0 dB referenced to full output power). These LED's also act as signal present indicators.

The rest of the green LEDs form a bar display indication of output levels from -20 dB to -5 dB.

The “CLIP” LED indicates when the amplifier output is clipping or limiting. It has two different indication statuses:

- If the clip limiter is engaged the CLIP LED has a short time constant and illuminates briefly.
- If the clip limiter is not engaged the CLIP LED has an increased time constant and illuminates for a longer period.

The remaining TEMP and PROTECT LEDs indicate if any protection circuits are activated. Protection features are described in the following section.

8. PROTECTION FEATURES

Each L-ACOUSTICS amplifier has many advanced protection features, protecting both the amplifier and the loudspeakers connected to it should a fault condition arise. Under normal use these features are inaudible. All protection circuits are independent.

8.1 CLIP LIMITER

The clip limiter prevents dangerous clipped signals from reaching the loudspeaker and causing damaging. When an amplifier is severely overdriven, the output waveform is clipped (peaks are squared off) – reducing the crest factor. In extreme cases, the waveform can approach that of a square wave. An amplifier is normally capable of producing far more power under these conditions than its normal undistorted rated output power.

The clip limiter works by monitoring the output and comparing the distortion produced between the input and output of the amplifier. If the distortion exceeds 1% THD for any reason (voltage or current clipping), the limiter reduces the input signal proportionally. Once the amplifier comes out of a protect condition, the output level has a slow rise time - the effect is like turning the gain up slowly. Note: if the signal is distorted or clipped before it reaches the amplifier, the clip limiter cannot detect it and will not be activated.

Under normal operation, clip limiting is inaudible. The limiter can be turned On or Off by depressing or pressing the relevant rear panel clip limit switch. L-ACOUSTICS recommends leaving the clip limiters switched ON at all times (Channel A, B rear panel clip limiter buttons depressed in the “IN” position).

8.2 THERMAL PROTECTION

If the amplifier is driven hard into a low impedance load, the cooling fans will run at high speed. If this condition persists, the Temperature indicator(s) will illuminate indicating that the amplifier is about to go into thermal shutdown.

After five seconds the amplifier will go into thermal protection by muting the input signal. After 15-20 seconds the amplifier will have cooled down enough for the amplifier to come out of shutdown and operate as normal. If the load conditions remain unchanged the thermal protection will be reinitiated. Thermal protection starts when the I**ntercooler**® heat sink reaches a temperature above 90^0 C.

8.3 VHF PROTECTION

If a signal above 12 kHz is detected at the amplifier outputs for more than five seconds at full output power, VHF protection mutes the input signal. This is indicated on the front panel LED indicator labeled PROTECT. After five seconds the outputs will un-mute and return to normal operation, unless the output signal has remained unchanged, in which case the VHF protection will re-initiate.

8.4 SHORT CIRCUIT PROTECTION

All L-ACOUSTICS amplifiers are completely short circuit-protected. Short circuit protection circuitry permits very high peak currents, but still holds the output devices within the safe operation area. If a short circuit condition is maintained, the affected channel will eventually go into thermal protect cycle until the short circuit has been removed.

8.5 AC MAINS VOLTAGE PROTECTION

If the AC mains voltage is outside the allowed operational voltage (over or under voltage), the power supply will automatically shut down. Once the mains voltage is above the minimum start voltage and below its maximum operating voltage the amplifier will restart. It takes a few seconds for the amplifier to self-check (this is known as the soft or slow start sequence), the gain will slowly and gradually be increased back to the previously set level and the fans will blow at high speed before going into idle. The two green "ON" LEDs indicate when the power supply is operating properly.

8.6 DC PROTECTION

There are two types of DC protection: 1) Fuses on the supply branches of each channel; 2) DC crowbar protection that shorts the output if more than 10 volts DC are detected on the outputs. Both these circuits are activated if a DC level is detected on either channel.

9. MAINTENANCE

Under normal use your power amplifier should provide years of trouble-free service. The only user maintenance required is to vacuum the front grill periodically.

In some extreme cases it may be necessary for authorized service personnel to clean the inside of the amplifier. This is usually necessary after prolonged use in environments where cracked-oil smoke machines are present.

If you are using your amplifier for heavy duty use, e.g. concert touring, it is recommended that you have your amplifier serviced every 3 years, purely as a preventative measure.

9.1 TROUBLESHOOTING

These are typical things to check if you think your amplifier is faulty:

Fault: No output.

If the output bar graph is functioning there is nothing wrong with the amplifier. The likely cause is an unsecured Speakon connector (at the amplifier output terminals or loudspeaker).

Check also that VHF protection is not activated. If it is, remove possible high frequency oscillations from the relevant input.

Fault: The amplifier goes into thermal protection when driven at low level.

Check that nothing causes a short circuit at the amplifier's output, e.g. faulty cabling or a loudspeaker component short circuit in the voice coil.

Fault: The amplifier goes into protection with the power indicators off.

Check that the AC line voltage is within the amplifier's operating range:130-265 V @ 230 V (or 65-135 V @ 115 V). Over/under-voltage protection may have occurred. If the amplifier is connected by mistake to a 3 phase supply, an internal non-resettable fuse or resistor may have blown (return the amplifier to your supplier for service).

Fault: The amplifier does not respond even after checking above items.

In the unlikely event of a non-user rectifiable fault, return the amplifier to your supplier or an approved service centre (see Section 11).

L-ACOUSTICS cannot be held responsible for damage or injury as a result of the top or bottom covers being removed.

10. WARRANTY

General

This product is manufactured by L-ACOUSTICS and is warranted to be free from defects in components and factory workmanship under normal use and service for a period of one year from the date of original purchase.

During the warranty period, L-ACOUSTICS or its nominated agents, will undertake to repair, or at their option, replace this product at no charge to its owner, if the unit fails to perform as specified, provided the unit is returned undamaged and shipping is pre-paid to the factory or an authorised service facility.

This warranty shall be null and void, if the product is subjected to:

1) Repair work or alteration by persons other than those authorised by L-ACOUSTICS or its agents.

2) Shipping accidents, war, civil insurrection, misuse, abuse, operation with incorrect AC voltage, operation with faulty associated equipment, exposure to inclement weather conditions and normal wear and tear. Units on which the serial number has been removed or defaced will not be eligible for warranty service.

L-ACOUSTICS shall not be responsible for any incidental or consequential damages, with respect to the products warranted.

L-ACOUSTICS reserves the right to make changes or improvements in design or manufacturing, without assuming any obligation to change or improve products previously manufactured.

This warranty is exclusive and no other warranty is expressed or implied. This warranty does not affect your statutory rights.

International

Please contact your supplier for this information, as rights and disclaimers may vary from country to country.

11. TECHNICAL ASSISTANCE AND SERVICE

International

If your L-ACOUSTICS product needs repair, contact your L-ACOUSTICS dealer or distributor, or contact L-ACOUSTICS by fax or email to obtain the location of the nearest authorized service center.

Factory Service

In the event that your L-ACOUSTICS product needs factory service, you should contact L-ACOUSTICS' service department for return instructions and a Return Authorisation number.

Please note for product return

1. Use the original packing.
2. Include a copy of the sales receipt, your name, return address, phone and fax number, email address and a description of the defect.
3. Mark the Return Authorisation number on the outside of the packing.
4. Ship the product prepaid to:

L-ACOUSTICS
Attention: After Sales Service (SAV)
Parc de la Fontaine de Jouvence
91462 Marcoussis – cedex
France

Telephone:	+33 169 63 69 69	Email:	info@l-acoustics.com
Fax:	+33 169 63 69 64	website:	www.l-acoustics.com